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COMPARISON OF ORAL MISOPROSTOL VERSUS INTRAMUSCULAR OXYTOCIN IN REDUCING DURATION OF THIRD STAGE OF LABOR

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Abstract

Objectives: *To compare outcome of oral misoprostol with intramuscular oxytocin in reducing duration of third stage of labor.*

Place & Duration of Study: Department of Obstetrics & Gynecology, Wapda Teaching Hospital, Lahore for three months w.e.f 05-03-2025 to 04-06-2025

Methodology: *After approval from the Hospital Ethical Review Board, eligible women were enrolled after counseling and informed consent, and randomly allocated by lottery method into two groups: Group A (oral misoprostol, n=30) and Group B (IM oxytocin, n=30). Group A received 600 mcg oral misoprostol and Group B received 10 units intramuscular oxytocin at delivery. Standardized obstetric procedures were followed, including controlled cord traction and uterine massage. Placenta management and side effects were recorded, and data were analyzed using SPSS version 26.*

Results: *A total of 60 women were included in the study with a mean age of 26.45±3.69 years; most were 20–27 years (61.7%). The mean gestational age was 38.93±1.44 weeks, and 58.3% were multiparous. The mean BMI was 25.49±3.71 kg/m², with 56.7% overweight or obese. Baseline variables were comparable between groups (p>0.05). The mean third stage duration was 5.73±2.03 minutes in Group A and 4.27±1.93 minutes in Group B (p=0.006). Fever, shivering, nausea, and vomiting were slightly higher in Group A but not significant. Stratification showed consistent superiority of Group B.*

Conclusion: *Intramuscular oxytocin was found to be more effective than oral misoprostol in reducing the mean duration of third stage of labor. Although adverse effects including fever, shivering, nausea, and vomiting were more frequent with oral misoprostol, the differences were not statistically significant. Intramuscular oxytocin may therefore be considered a preferable option for active management of third stage of labor.*

INTRODUCTIONL

abor is defined as a series of events that leads to the expulsion of fetus and its products from the uterus. There are three stages of labor. First stage starts with the diagnosis of labor to full dilation of the cervix. Second stage ends with the delivery of the fetus.[1] The third stage of labor, which
lasts between five and fifteen minutes and is distinguished by the delivery of the fetus and the expulsion of the placenta and membrane, is the most dangerous since there is a chance of heavy bleeding.

Although it lasts a short time, the third stage of labor can be particularly risky for mothers' health.[1,2] Active management of the third stage of labor (AMTSL) is a combination of intervention performed by skilled birth attendant designed to facilitate the delivery of the placenta by increasing uterine contraction during the third stage of labor and also used to prevent postpartum hemorrhage (PPH) by averting uterine atony.[3,4]

In early 2012, the WHO held a technical consultation and issued new recommendations regarding active management of third stage of labor (AMTSL), which can be used to strengthen and focus the implementation of this lifesaving intervention.[5,6] Oxytocin is the current standard of care but its use in the developing countries is limited by the problems of cost, storage and skill for administration. Therefore, identifying an effective and safe uterotonic drug that is affordable and does not require a high-tech facility for storage or specialized skill for administration like oxytocin for the management of third stage of labor, especially in the third world countries will significantly reduce maternal abnormalities and mortality arising from PPH.[7,8]

Garg et al. in India reported mean duration of third stage of labor insignificantly less in oral misprosotl group than IM oxytocin group (4.98±0.25 vs. 5.20±1.51; p-value=0.153).6 Similar insignificant difference was reported by Kaudel et al. in Nepal (4.76±1.69 vs. 4.90± 1.37 min; p-value= 0.935) respectively between oral misoprostol and IM oxytocin groups.[8] In the light of above studies where insignificant and less mean duration of third stage of labor has been reported between oral misoprostol and intramuscular oxytocin groups, it seems highly imperative to replace conventional IM oxytocin therapy with latest oral misoprostol that is easy in handling and management. But prior to its advocacy, it is important to see some other studies as well that have reported otherwise. Alam et al. India reported significantly high mean duration of third stage of labor in oral misoprostol group than IM oxytocin group (6.47±1.51 vs. 5.13±1.91; p-value<0.05).[9] Though Abd Allah et al. (2021) Egypt also reported higher mean duration of third stage of labor in oral misoprostol group but the difference was not significant (3.48±1.76 vs. 3.35±.62; p-value=0.434).10

Above data[6,8,10] is not conclusive and contains controversy regarding equivalence or supremacy of both treatment options over each other. Therefore, this study was planned in local population to resolve this controversy and to reach a definite conclusion for better management of third stage of labor in future practice.

Methodology

This study was designed as a randomized controlled trial conducted in the Department of Obstetrics & Gynecology at WAPDA Teaching Hospital. The duration of the study was three months after approval of the synopsis. A total sample size of 60 patients, with 30 participants in each group, was calculated using 80% power of the test and a 95% confidence interval, based on the expected mean duration of the third stage of labor of 6.47±1.51 minutes versus 5.13±1.91 minutes.[9]

Non-probability consecutive sampling was used for patient recruitment. Outcome was assessed primarily by measuring the mean duration of the third stage of labor in minutes using a stopwatch, defined as the interval from delivery of the baby until complete placental expulsion. In the intervention groups, oral misoprostol 600 mcg and intramuscular oxytocin 10 units were administered at the time of delivery according to protocol.

The study included women aged 20-35 years with gestational age between 37-42 weeks, vertex presentation, parity ranging from 0-4, and spontaneous vaginal delivery of a single live fetus. Patients with risk factors for postpartum hemorrhage, including grand multiparity greater than five, polyhydramnios, fetal macrosomia, previous history of postpartum hemorrhage, multiple gestation, pregnancy-induced hypertension, premature rupture of membranes, chorioamnionitis, fibroid uterus, intrauterine death, prolonged labor, antepartum hemorrhage, post-dated pregnancy, and instrumental deliveries, were excluded.

Women with underlying medical disorders such as anemia, cardiovascular, respiratory, hepatic, or hematological diseases were also excluded to control confounding variables and maintain homogeneity. All eligible participants were counseled, and written

informed consent was obtained prior to enrollment. Patients were then randomly allocated into two groups using the lottery method.

Group A received 600 mcg oral misoprostol at the time of delivery, while Group B received 10 units intramuscular oxytocin after delivery of the anterior shoulder. Standard procedures, including delivery position, early cord clamping, and controlled cord traction by Brandt and Andrew's method, were applied uniformly. If the placenta was not delivered within 30 minutes, it was considered retained and removed manually, followed by uterine massage and monitoring.

All interventions were carried out by the same clinical team to minimize bias. Findings were recorded by the resident and verified by a senior consultant. Data regarding side effects such as fever, shivering, nausea, and vomiting were also documented. Statistical analysis was performed using SPSS version 26. Numerical variables were expressed as mean±SD, categorical variables as frequencies, and independent sample t-test was applied with $p \leq 0.05$ considered statistically significant. Stratification was also performed to control for effect modifiers.

Results

A total of 60 women were included in the study. The mean age of the participants was 26.45±3.69 years. Most of the women, 37 (61.7%), were between 20-27 years of age, while 23 (38.3%) participants belonged to the 28-38 years age group. The mean gestational age was 38.93±1.44 weeks. Out of the total participants, 39 (65.0%) women had gestational age between 37-39 weeks, whereas 21 (35.0%) had gestational age between 40–42 weeks. Regarding parity status, 25 (41.7%) women were primipara and 35 (58.3%) were multipara. The mean BMI of the study population was 25.49±3.71 kg/m². Among the participants, 26 (43.3%) had normal BMI, while 34 (56.7%) were overweight or obese. Data is given in Table I.

Mean age, gestational age, parity, and BMI were comparable between both groups, with no statistically significant difference observed ($p>0.05$) as shown in Table II.

The mean duration of third stage of labor was 5.73 ± 2.03 minutes in Group A and 4.27 ± 1.93 minutes in Group B. The difference between both groups was statistically significant (p=0.006). Data is given in Table III.

Fever was observed in 4 (13.3%) women in Group A and 2 (6.7%) women in Group B, with no statistically significant difference between the groups (p=0.671). Shivering occurred in 5 (16.7%) participants in Group A and 3 (10.0%) participants in Group B (p=0.706). Nausea was reported in 4 (13.3%) women in Group A and 3 (10.0%) women in Group B (p=1.000). Vomiting was noted in 2 (6.7%) participants in Group A and 1 (3.3%) participant in Group B, and the difference was statistically insignificant (p=1.000) as shown in Table IV.

Stratification of mean duration of third stage of labor for age, gestational age, parity, and BMI showed similar superiority of Group B over Group A; however, statistical significance was not achieved in all subgroups due to small sample size.

Table I: Demographic Characteristics of Women Included in the Study

Characteristics	Total (n=60)
Age (years)	26.45±3.69
• 20-27 years	37 (61.7%)
• 28-38 years	23 (38.3%)
Gestational Age	38.93±1.44
• 37-39 weeks	39 (65.0%)
• 40-42 weeks	21 (35.0%)
Parity	
• Primipara	25 (41.7%)
• Multipara	35 (58.3%)

BMI (kg/m^2)	25.49±3.71
• Normal Weight	26 (43.0%)
• Overweight/Obese	34 (56.7%)

Table II: Comparison of Baseline Characteristics between the Study Groups

Characteristics	Group A (n=30)	Group B (n=30)	p-value
Age (years)	26.10±3.51	26.80±3.88	0.467
• 20-27 years	20 (66.7%)	17 (56.7%)	0.426
• 28-38 years	10 (33.3%)	13 (43.3%)	
Gestational Age	39.00±1.39	38.87±1.50	0.723
• 37-39 weeks	21 (70.0%)	18 (60.0%)	0.417
• 40-42 weeks	9 (30.0%)	12 (40.0%)	
Parity			
• Primipara	12 (40.0%)	13 (43.3%)	0.793
• Multipara	18 (60.0%)	17 (56.7%)	
BMI (kg/m^2)	25.30±3.84	25.68±3.63	0.698
• Normal Weight	14 (46.7%)	12 (40.0%)	0.602
• Overweight/Obese	16 (53.3%)	13 (60.0%)	

Chi Square test/ Independent sample t test, taking p-value >0.05 as insignificant.

Table III: Comparison of Mean Duration of Third Stage of Labor

Characteristics	Group A (30)	Group B (n=30	p-value
Mean Duration of Third Stage of Labor (min)	5.73±2.03	4.27 ± 1.93	0.006

Independent sample t test, taking p-value ≤0.05 as significant.

Table IV: Stratification of Mean Duration of Third Stage of Labor between Subgroups

Characteristics	Group A (30)	Group B (n=30)	p-value
Fever			
• Yes	4 (13.3%)	2 (6.7%)	0.671
• No	26 (86.7%)	28 (93.3%)	
Shivering			
• Yes	5 (16.7%)	3 (10.0%)	0.706
• No	25 (83.3%)	27 (90.0%)	
Nausea			
• Yes	4 (13.3%)	3 (10.0%)	1.000
• No	26 (86.7%)	27 (90.0%)	
Vomiting			
• Yes	2 (6.7%)	1 (3.3%)	1.000
• No	28 (93.3%)	29 (96.7%)	

Chi Square test/Fisher's Exact test, taking p-value>0.05 as insignificant.

Discussion

The third stage of labor is a critical period associated with an increased risk of postpartum hemorrhage, which remains a major cause of maternal morbidity and mortality.[11,12] Active management of the third stage of labor is therefore essential to reduce complications. Intramuscular oxytocin has long been used as the standard uterotonic agent; however, its administration requires skilled personnel and proper storage facilities.[13,14] Oral misoprostol has emerged as an alternative due to its ease of administration, low cost, and better availability. Previous studies have reported conflicting results regarding the effectiveness of both drugs;[6,8,10] therefore, this study was planned to compare their efficacy in reducing the duration of third stage of labor.

In the present study, the mean age of participants was 26.45±3.69 years. Most women (61.7%) were between 20-27 years, while 38.3% were in the 28-38 years age group. This pattern is consistent with the reproductive age distribution commonly seen in obstetric populations. Similar age distribution was observed in Shamsi et al., where the mean age was 25.92±4.55 years, showing close agreement with the current findings.[15] This similarity suggests that both studies included comparable reproductive age groups, making results more generalizable within similar settings.

The mean gestational age in the present study was 38.93±1.44 weeks, with 65% of women between 37–39 weeks and 35% between 40–42 weeks. This is comparable to Alam et al., who also included term pregnancies with a similar gestational range.[9] Likewise, Abd-Allah et al. reported similar inclusion of term gestations, ensuring that uterotonic effects were assessed in a comparable physiological state.[10] The parity distribution in the current study showed 41.7% primiparous and 58.3% multiparous women. Similar trends were reported by Shamsi et al., where multiparous women were slightly higher (60%), indicating comparable obstetric profiles across studies.[17]

In the present study, the mean duration of third stage of labor was significantly shorter in Group B (oxytocin) i.e., 4.27±1.93 minutes compared to Group A (misoprostol) i.e., 5.73±2.03 minutes (p=0.006). These findings are in agreement with Mishra et al., who also reported a significantly shorter third stage in the oxytocin group (3.65±1.75 vs. 5.31±2.1 minutes, p<0.001).[5] Similarly, Alam et al. demonstrated shorter duration with oxytocin (5.13±1.91 minutes) compared to misoprostol (6.47±1.51 minutes).[9] However, contrasting evidence exists as Garg et al.[6] and Kaudel et al.[8] reported no statistically significant difference between the two drugs, suggesting comparable efficacy in some populations. The mean duration of the third stage of labor was 4.76 ± 1.69 minutes in the misoprostol group and 4.39±1.37 minutes in the oxytocin group. There was no statistically significant difference between the two groups regarding the duration of the third stage of labor (p = 0.64). Samboo et al. reported that the mean duration of the third stage of labor was 3.85 ± 3.36 minutes in the misoprostol group and 4.15 ± 4.02 minutes in the oxytocin group, with no statistically significant difference between the two groups (p = 0.503).[15] Naskar et al. reported that the mean duration of the third stage of labor was 5.07 ± 0.26 minutes in the misoprostol group and 5.11 ± 0.32 minutes in the oxytocin group, with no statistically significant difference observed between the groups (p = 0.64).[16] These variations may be due to differences in dosage timing, route of administration, and study settings.

In terms of side effects, fever was observed in 13.3% of women in Group A and 6.7% in Group B, shivering in 16.7% vs. 10.0%, nausea in 13.3% vs. 10.0%, and vomiting in 6.7% vs. 3.3%, respectively. Although these differences were statistically insignificant, all adverse effects were more frequent in the misoprostol group. Similar findings were reported by Mishra et al., where fever and shivering were significantly higher in the misoprostol group.[5] Musa et al. also found increased pyrexia and shivering with misoprostol use.[18] Onyekpa et al. further supported these findings by reporting higher overall side-effect burden in the misoprostol arm, with statistically significant differences (p=0.03).[19] In contrast, Nahar et al. observed no significant difference in overall side effects between both groups, although misoprostol still showed a higher trend.[20]

The stratified analysis of the present study showed that oxytocin remained superior across age, gestational age, parity, and BMI subgroups in reducing third stage duration. However, statistical

significance was not achieved in all subgroups, likely due to limited sample size. Similar subgroup consistency was reported by Shamsi et al., whereas Garg et al. and Kaudel et al. reported no meaningful effect modification after stratification, suggesting uniform drug performance across demographic categories.

Overall, the present study demonstrates that intramuscular oxytocin is more effective than oral misoprostol in reducing the duration of the third stage of labor, while both drugs have comparable and mild side-effect profiles. Although literature remains somewhat conflicting, the majority of evidence favors oxytocin for faster placental delivery, whereas misoprostol remains a useful alternative in selected settings, particularly where storage and administration of oxytocin may be challenging.

The study's strength lies in its randomized controlled design with comparable baseline characteristics and standardized protocols, enhancing internal validity. Limitations include small sample size and single-center setting, which may affect generalizability. Future research should involve larger multicenter trials to validate findings and further explore optimal uterotonic regimens in diverse populations.

CONCLUSION

Intramuscular oxytocin was found to be more effective than oral misoprostol in reducing the mean duration of third stage of labor. Although adverse effects including fever, shivering, nausea, and vomiting were more frequent with oral misoprostol, the differences were not statistically significant. Intramuscular oxytocin may therefore be considered a preferable option for active management of third stage of labor.

AUTHOR'S CONTRIBUTION

Author 1

Substantial contributions to study concept, design, acquisition of data, Analysis & Interpretation of Data, Manuscript writing and critical review. Has given final approval of the version to be published. Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Author 2

Substantial contributions to concept, study design Data Analysis, Manuscript writing and Critical Review. Has given final approval of the version to be published. Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

PATIENT'S CONSENT

Informed written consent was obtained from each study subject.

CONFLICT OF INTEREST

The authors declared no conflict of interest.

REFERENCES

Gelaw KA, Assefa Y, Birhan B, Gebeyehu NA. Practices and factors associated with active management of the third stage of labor in East Africa: systematic review and meta-analysis. BMC Pregnancy Childbirth. 2023;23(1):438-48. doi:10.1186/s12884-023-05761-9.

Hersh AR, Carroli G, Hofmeyr GJ, Garg B, Gülmezoglu M, Lumbiganon P, et al. Third stage of labor: evidence-based practice for prevention of adverse maternal and neonatal outcomes. Am J Obstet Gynecol. 2024;230(3S):S1046-S60. doi:10.1016/j.ajog.2022.11.1298.

Molla W, Demissie A, Tessema M. Active management of third stage of labor: practice and associated factors among obstetric care providers in North Wollo, Amhara Region, Ethiopia. Obstet Gynecol Int. 2021;31(1);1-10. doi: 10.1155/2021/9207541.

Rotem R, Lipski A, Weintraub AY, Baumfeld Y, Yohay D, Press F, et al. Third stage of labor placental complications and placenta-associated syndromes. J Matern Fetal Neonatal Med. 2021;34(20):3350-4. doi: 10.1080/14767058.2019.1684468.

Mishra S, Tirkey S, Prasad A, Trivedi K, Mishra S, Tirkey II S. A comparative study of sublingual misoprostol versus intramuscular oxytocin in the active management of third stage of labor. Cureus 2023;4;15(1)1-7.

Garg N, Kulshreshtha A, Malhotra S. Comparison of oral misoprostol versus intramuscular oxytocin for active management of third stage of labour: a single centre randomised controlled study. Int J Repord Contracept Obstet Gynecol. 2023;12(4):1033-7. doi:10.18203/2320-1770.ijrcog20230808.

Chaudhry S, Rajani H, Rais R, Ali HS. Efficacy and safety of misoprostol administered rectally compared with oxytocin for the prevention of postpartum hemorrhage. Pak J Med Dentist. 2022;11(4):61-6. doi:10.36283/PJMD11-4/010.

Kaudel S, Rana A, Ojha N. Comparison of oral misoprostol with intramuscular oxytocin in the active management of third stage of labour. Nepal J Obstet Gynaecol 2015;10(1)76-80.

Alam A, Shyam P, Goswami S. A comparative study of efficacy of oxytocin, methylergometrine and misoprostol in prevention of post-partum haemorrhage. Int J Reprod Contracept Obstet Gynecol 2017;6(5):1960-4. doi:10.18203/2320-1770.ijrcog20171957.

Abd Elaty Abd Allah W, Ibrahem Hassan F, Fawzy Mohamed M. Oral misoprostol versus intramuscular oxytocin in the active management of the third stage of labour. Al-Azhar Med J 2021;50(1):367-76. doi: 10.12816/amj.2021.139729.

Fissahaye B, Dheresa M, Assefa N, Tesfaye D, Eyeberu A, Balis B, et al. Active management of the third stage of labor and associated factors among maternity care providers in public health facilities in Eastern Ethiopia: a multi-center study. BMC Pregnancy Childbirth. 2023;23(1):701. doi:10.1186/s12884-023-06009-2.

Fatima N, Kanwal T, Choudhary SA, Zia S, Iram H, Saleem L. Intravenous oxytocin versus oxytocin combined with misoprostol in the management of the third stage of labor in vaginal delivery. Pak J Med Health Sci. 2023;17(4):614. doi:10.53350/pjmhs2023174614.

Angarita AM, Berghella V. Evidence-based labor management: third stage of labor (part 5). Am J Obstet Gynecol MFM. 2022;4(5):100661. doi: 10.1016/j.ajogmf.2022.100661.

Xu R, Guo Y, Zhang Q, Zeng X. Comparison of clinical efficacy and safety between misoprostol and oxytocin in the prevention of postpartum hemorrhage: a meta-analysis. J Healthc Eng. 2022;2022:3254586. doi:10.1155/2022/3254586.

Sambo AA, Ijaiya MD, Nwachukwu D, Nwosu IC, Idris H, Abdullateef RM, et al. A randomized controlled study comparing oral misoprostol with intramuscular oxytocin in active management of third stage of labour. Obstet Gynecol Sci. 2024;67(3):279-85. doi:10.5468/ogs.23128.

Naskar A, Dasgupta I, Das R. Oral misoprostol versus intramuscular oxytocin in active management of third stage of labour: a comparative study. J Evid Based Med Healthc. 2019;6(5):257-61. doi:10.18410/jebmh/2019/53.

Shamsi R, Yawar M, Sohail R, Asim A. comparison of mean duration of third stage of labor with oral misoprostol versus intramuscular oxytocin. J Fatima Jinnah Med Uni. 2023;17(3):107-10. doi:10.37018/jfjmu/rub/1082.

Musa AO, Munir'deen AI, Saidu R, Aboyeji AP, Jimoh AA, Adesina KT, et al. Double-blind randomized controlled trial comparing misoprostol and oxytocin for management of the third stage of labor in a Nigerian hospital. Int J Gynecol Obstet. 2015;129(3):227-30. doi: 10.1016/j.ijgo.2015.01.008.

Onyekpa IJ, Odugu BU, Onah LN, Okafor II. Comparison of oral misoprostol with intravenous oxtocin in the in the management of the third stage of labour: a randomized controlled trial. Int J Med SciClin Invent. 2021;8(9):5676-82. doi: 10.18335/ijmsci.v8i09.015.

Nahar K, Rana M, Nahar N, Ahmed M, Akter S, Ahmed F. Effect of misoprostol versus oxytocin in reducing postpartum hemorrhage after labor induction. Med Res Chronicles. 2022;9(6):687-94. doi:10.26838/MEDRECH.2022.9.6.668.